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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Method of and Press Mould for Covering Edges and Profiles of Boards

I, JAKOB FRIEDRICH WERZ, JR., a German Citizen, personally responsible partner of the Firm FURNIER- UND SPERRHOLZWERK J. F. WERZ JR. K.G. WERZALITPRESSHOLZWERK, of Oberstenfeld, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a method of covering edges and profiles of boards and shaped parts of organic materials, preferably of wood materials, for example chipboards, with synthetic plastic sheets which are hardenable under pressure and heat.

It is known that plane edges of wood materials can be covered with strips of previously hardened laminated synthetic plastic or with a polymerised plastic sheet, the strips or sheets being secured by gluing or cementing. This known method for the covering of edges has however the disadvantage that the covering material does not enter into any direct union with the carrier, and the glue joint will not withstand thermal or heavy mechanical stressing, so that the covering will then become detached from the carrier. In cases of covering with decorative laminated plastics, the, usually brown, base sheet of the laminated plastic is necessarily visible after the covering. In addition, it is very difficult to remove jagged edges from glued laminated plastics, and the latter are very expensive. Polymerised synthetic plastic sheets readily become electrostatically charged, which results for example in the attraction of dust. In addition, the surface of such sheets is relatively soft. A disadvantage in both these methods of covering is moreover that after gluing to the carrier, adhesion is considerably less in the zones of lesser density than in the zones of greater density of the carrier, which is disadvantageous in use particularly in the case of the covering of edges of chipboard.

According to one aspect of the present invention a method is provided for covering the edges or profiles of shaped parts or boards of organic materials, which shaped parts or boards have zones of lower density, with synthetic plastic sheets which are hardenable under pressure and heat, wherein the edges of the shaped parts or boards which have zones of lower density are so shaped that when the synthetic plastic sheet is pressed on to them in a pressing operation and contact heat is applied by a hot face of a pressing element, an additional compacting is effected in the region of the said zones, whereby over the area to be covered a sufficient counter-pressure is produced and the synthetic resin forming the sheet and being subjected to final condensation flows uniformly and enters into an intimate union with the material of the said shaped part or board.

According to a further aspect of the present invention, a method is provided for covering the edges or profiles of shaped parts or boards of organic materials, which shaped parts or boards have zones of lower density, with synthetic plastic sheets which are hardenable under pressure and heat, wherein in pressing the sheet onto the shaped part or board, sufficient pressure is produced in the zones of the shaped part or board which have lower density, by means of a flexible, heated press stamp, this pressure being maintained throughout the duration of the pressing operation so that over the area to be covered an adequate counter-pressure is produced, whereby the synthetic resin composing the sheet and being subjected to final

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condensation flows uniformly and enters into an intimate union with the material of the said shaped part or board.

By the methods according to the invention, edges and profiles of boards and shaped parts of organic materials, for example chipboards, are covered direct by the application of pressure and heat with synthetic plastic sheets which have not yet been finally condensed, for example sheets formed by papers impregnated with melamine resin, whereby part of the synthetic resin of the sheet becomes fluid under the action of the heat and pressure and during the condensation process is intimately bonded to the carrier, that is to say the board or shaped part, while by means of the press stamp utilised for the production of pressure the synthetic resin caused to flow is pressed into the form of a smooth, resistant surface layer. Since the covering sheet can condense only in the region of the edge or profile to be covered, the projecting portions of the sheet, which become highly brittle under the action of heat without pressure, can easily be removed. Since the plastic sheet undergoes intimate bonding to the carrier and through the flowing of the resin any slight irregularity of the carrier is compensated, no disturbing gaps are formed in the region of the corners of edges and profiles. Thus it is possible, for example to cover the edges of synthetic plastic coated chipboards with decorative material of the same pattern and same colour as the material with which the faces of the chipboards are coated, so that the final product produces optically a completely enclosed impression.

In order to ensure that the covering sheet will undergo intimate bonding with the carrier in all regions of the union, and that the surface will be free from pores and smooth over the entire covered area, not only must sufficient heat and pressure be produced during the pressing, but in addition adequate counter-pressure must be ensured in the entire region over which the carrier is to be covered. In the event of the sheet not being pressed on to the carrier in such a manner as to be free from pores, visible dirt, which afterwards cannot be removed, will in fact collect in the pores. For this reason, for example ordinary commercial chipboard, the middle layer of which has a lower density than its outer layer, cannot be perfectly coated direct with synthetic resin sheets on account of the insufficient density of the middle layer. In order to produce adequate counter-pressure in the zones of lower density, according to the invention these zones are additionally compacted in the pressing operation. This can be done by forming the shape of either the edges or profiles of the carrier or else the press stamp itself in such a manner that the zones of reduced density are correspondingly compacted to a greater extent. Thus either the area of the carrier which is to be covered, or the press stamp itself may be given a convex shape or else the surface of the press stamp may have a flexible layer which during the pressing operation adapts itself to the edge or profile in the zone of reduced density. If the edges or profiles of a plurality of boards or shaped parts are to be covered simultaneously, then the corresponding press stamps are preferably sprung in relation to one another in such a manner that dimensional tolerances in the boards or shaped parts are compensated, so that all the edges or profiles to be covered receive sufficient pressure during the pressing operation. The springing of the individual press stamps is effected by means of springs, by a hydraulic or pneumatic system, or by a rubber cushion. In the event of mainly sharp-edged profiles having to be covered, the covering sheets are advantageously plasticised in the region of the bending zone by the action of heat for a short time, and if desired pre-shaped in a separate device in accordance with the profile to be covered, the temperature, duration of shaping, and bending pressure being so proportioned that final condensation of the synthetic resin of the machine is avoided. The pre-shaped sheet is then pressed on to the profile with the application of pressure and heat in accordance with the above description, whereby the final condensation of the synthetic resin is effected. In order to achieve sufficient pressure over the entire area to be covered in the covering of profiles, the sheet is optionally pressed on to the profile in an inclined pressing direction in relation to the latter by means of one or more profiled press stamps, while in the case of the use of a plurality of press stamps which are sprung in relation to one another dimensional tolerances of the profile to be coated are compensated, since the springing ensures exact adaptation of the individual stamps to the profile.

In order to carry out the method according to the invention, use may be made of a press mould the press stamps of which have a shaping surface consisting of a flexible heatable material, for example a band of chrome-nickel steel, which is joined to a pressure cushion, for example of heat-resistant silicone rubber, which in turn is joined to a heatable pressure beam. Through the flexible surface of the press stamp, the zones of lower density of the shaped parts and boards to be covered are additionally compacted, while in addition any irregularities which exist are compensated. The flexible surface material of the stamp is heated by electrical resistance means. In order to obtain the uniform temperature necessary for

the pressing, despite the low thermal storage capacity of the surface material, the pressure beam is, for example correspondingly heated by electricity or steam. Alternatively, for performing the method according to the invention, use may be made of a press mould, the pressure beam of which is sub-divided in accordance with the number of edges or profiles to be coated into individual movable segments, which are individually sprung in the direction of the pressure, for example by means of springs, whereby dimensional variations in the boards or shaped parts to be covered are compensated. Preferably a rigid counter-pressure beam is provided which is subdivided in accordance with the edges and profiles to be covered, into individual movable elements which are individually sprung. The effect is thereby achieved that with a determined constructional height of the press mould, the edges or profiles of the largest possible number of parts can be covered simultaneously. Since this press mould enables the boards or shaped parts to be coated in the region of the edges or profiles at short distances from one another, a single sheet can be used for covering a plurality of parts, as is desirable from the point of view of manufacturing technique, without having expensive losses of sheet.

The above described methods of the invention, and the press moulds for performing them, will be clear from the accompanying drawings which are given by way of example and in which:—

Fig. 1 is a sectional view showing a board which is about to be covered at its edge by a sheet of synthetic plastic material, and a press stamp for acting on the sheet;

Fig. 2 is a view, similar to Fig. 1, but in which the synthetic plastic sheet is shown in the process of being applied to the edge of the board;

Fig. 3 is a sectional view, generally similar to Fig. 1, but showing a modified press stamp;

Fig. 4 is a view, similar to Fig. 2, but for the modified press stamp of Fig. 3;

Fig. 5 is a sectional view, generally similar to Fig. 1, but showing another modified press stamp;

Fig. 6 is a sectional view, generally corresponding to Fig. 1, but showing a multiple arrangement of press stamps, and three boards to be covered at their edges;

Fig. 7 is a sectional view showing a press stamp arrangement for covering the edges of profiled boards; and

Fig. 8 is a sectional view showing a multiple press stamp arrangement for simultaneously covering the edges of five boards arranged one above the other.

Fig. 1 shows a board 1, for example of chipboard, which is covered with synthetic plastic material, which is hardenable under pressure and heat, at its faces and which has zones 2 of greater density and a zone 3 of lower density. The board 1 has a convex edge 4. The board 1 is disposed on a spacer bar 6 and a sheet 7 of synthetic plastic material is arranged adjacent to the convex edge 4 of the board, so as to be pressed thereonto by a press stamp 5.

The press stamp 5 has heating means and presses the covering sheet 7 onto the edge of the board 1, as shown in Fig. 2. At the same time, the convex edge 4 of the board 1 is flattened so that at the edge of the board a zone 8 arises which is additionally compacted by the application of pressure from the stamp 5. The region 9 of the sheet 7 is thus intimately bonded to the edge of the board due to the pressure and heat, and the overhanging sheet residues 10 become brittle owing to lack of pressure thereon.

The arrangement of Fig. 3 is similar to that of Fig. 1, but the press stamp 11 has a convex face and the board has a flat edge 13. The board, for example of chipboard, has a middle region 12 of lower density, and its edge 13 is to be covered by a covering sheet 14 of synthetic plastic material, by the action of the press stamp 11, which is heated. As will be seen from Fig. 4, the press stamp 11 compacts the board at its middle region 12 during the pressing so as to produce a concave edge, and a portion 16 of the covering sheet 14 is bonded to the thus produced concave edge due to the pressure and heat, the compacted region of the board edge being indicated by reference numeral 15.

In the arrangement of Fig. 5, a further modified press stamp is used in which a pressure beam 17 which has a heating device 18 is connected to a pressure cushion 19 of heat-resistant silicone rubber. The pressure cushion 19 is in turn joined to a flexible band 20 of chrome-nickel steel which is heated by electric resistance means. A sheet 21 of synthetic plastic material is bonded to the board 22 during the pressing in such a manner that the flexible surface of the press stamp, provided by the band 20, additionally compacts the middle zone of the board where its density is lower, by virtue of the zone of the low density yielding more readily to the pressure than the higher density face portions. This compacting causes the edge to become slightly concave.

Fig. 6 shows an arrangement of three press stamps 23 which are disposed one above the other and which are sprung in relation to one another by springs 24. A pressure beam 25 acts on all the press stamps 23 through the springs 24. This enables the simultaneous covering of the edges of three boards 27, arranged one above the

other, and which may have small dimensional variations amongst each other, by a synthetic plastic sheet 26. Parts of the sheet 26 become brittle and separate owing to lack of pressure thereon.

Fig. 7 shows an arrangement for covering the edge of a profiled board 28 disposed on a support bar 29. A preshaped sheet 30 of synthetic plastic material is pressed on to the profile surfaces 33 of the board 28, which have density variations, by means of heated press stamps 31 which are sprung in relation to one another and which are disposed obliquely in relation to the profile, with the aid of a pressure beam 32.

Fig. 8 shows an arrangement of a press mould having a plurality of press stamps which can be heated. Three of the press stamps 34 are sprung in relation to one another, and act as counter-pressure stamps together with a rigid beam 36, the other press stamps 35 being sprung in relation to each other and act together with a movable beam as pressure stamps. A movable beam 37 at the pressure side acts as a ram for the stamps 35 and during the pressing operation displaces the boards 38 against the rigid beam 36 and its press stamps 34. The boards 38 having dimensional variations, sheets 39 of synthetic plastic material for covering the edges of the boards, and spacer bars 40 are inserted in the press tool. It will be seen that in this arrangement a large number of boards can have their edges covered in the same pressing operation, for a given constructional height of the press mould.

In order to effect additional compacting in the zones of the shaped parts or boards having a lower density, the edges of the boards to be covered in Figs. 6 to 8 are given a slightly convex shape.

WHAT I CLAIM IS:—

1. A method of covering the edges or profiles of shaped parts or boards of organic materials, which shaped parts or boards have zones of lower density, with synthetic plastic sheets which are hardenable under pressure and heat, wherein the edges of the shaped parts or boards which have lower density are so shaped that when the synthetic plastic sheet is pressed on to them in a pressing operation and contact heat is applied by a hot face of a pressing element, an additional compacting is effected in the region of the said zones, whereby over the area to be covered a sufficient counter-pressure is produced and the synthetic resin forming the sheet and being subjected to final condensation flows uniformly and enters into an intimate union with the material of the said shaped part or board.

2. A method of covering the edges or profiles of shaped parts or boards of organic materials, which shaped parts or boards have zones of lower density, with synthetic plastic sheets which are hardenable under pressure and heat, wherein in pressing the sheet onto the shaped part of board, sufficient pressure is produced in the zones of the shaped part or board which have lower density, by means of a flexible, heated press stamp, this pressure being maintained throughout the duration of the pressing operation so that over the area to be covered an adequate counter-pressure is produced, whereby the synthetic resin composing the sheet and being subjected to final condensation flows uniformly and enters into an intimate union with the material of the said shaped part or board.

3. A method as claimed in claim 1 or 2, for covering a plurality of identical edges or profiles, wherein the pressure is produced by two or more heated press stamps adapted to the edges or profiles and sprung in relation to one another, whereby the dimensional variations of the boards or shaped parts is compensated, the stamps being so disposed that over the entire area of the edges and profiles to be covered a pressure adequate for the covering is produced, while in addition the individual stamps are provided with a pressure cushion in order to compensate during the pressing operation for irregularities and for insufficient density of the shaped parts or boards.

4. A method as claimed in claim 1 or 2, wherein the covering of profiles, the covering sheet is previously plasticised by the action of slight pressure and heat and shaped in accordance with the desired profile, the temperature, duration of deformation, and pressure being so proportioned that the final condensation of the synthetic resin of the covering sheet, necessary during covering of the profile, is avoided during the shaping.

5. A method as claimed in claim 1 or 2, wherein a covering sheet, pre-shaped in accordance with the shape of the profile to be covered, is pressed on to the latter by one or more press stamps, constructed in accordance with the profile, with an oblique pressure direction in relation to the profile, the inclined arrangement of the stamp or stamps being such that an adequate pressure over the entire area of the profile is ensured, while in the case of a plurality of stamps these are sprung in relation to one another, so that dimensional variations of the profile to be covered are compensated.

6. A press mould when used in carrying out the method of claims 1, 2 or 3, comprising a press stamp having a shaping surface consisting of a flexible, heatable material which is joined to a pressure cushion, which in turn is joined to a heatable pressure beam, whereby during the pressing operation, irregularities and insufficient

density in determined zones of the shaped part or board being covered are compensated.

7. A press mould when used in carrying out the method of claim 1, 2 or 3, comprising a pressure beam which is subdivided, in accordance with the profiles or edges to be covered, into individual movable elements which are individually sprung in the direction of the pressure, so that dimensional variations between the two or more boards or shaped parts to be covered are compensated.

8. A press mould as claimed in claim 7, wherein a rigid counter-pressure beam is provided which is sub-divided, in accordance with the profiles or edges to be covered, into individual movable elements which are individually sprung, whereby the structural height of the individual elements is distributed in the pressure and counter-pressure regions, so that within a press mould of a given height an optimum number of parts or boards can have their edges covered.

9. Methods of covering the edges of shaped parts or boards of organic material, substantially as hereinbefore described with reference to the accompanying drawings.

10. Press moulds when used in performing the methods of claim 9, constructed, arranged and adapted to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

H. A. L. VENNER,
Chartered Patent Agent,
Rugby Chambers, 2, Rugby Street,
London, W.C.1,
Agent for the Applicant.

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Fig. 1

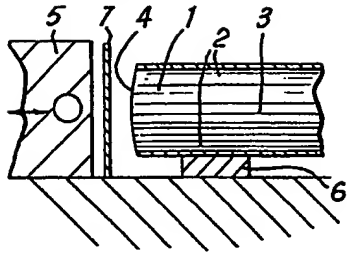


Fig. 2

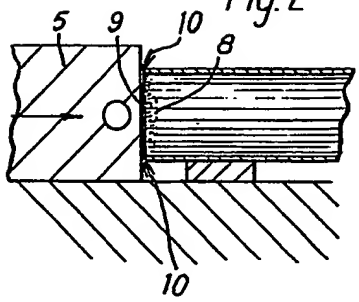


Fig. 3

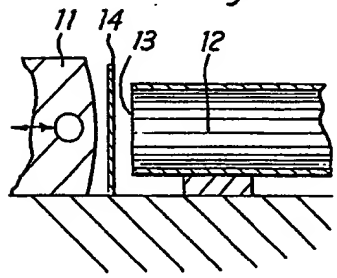


Fig. 4

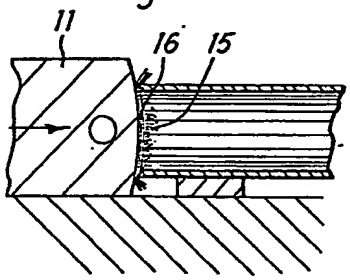


Fig. 5

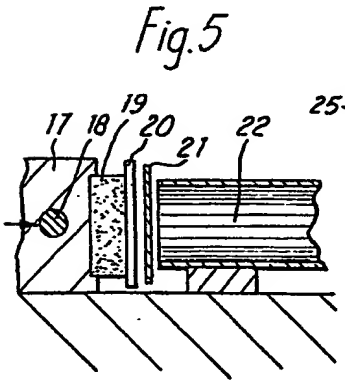
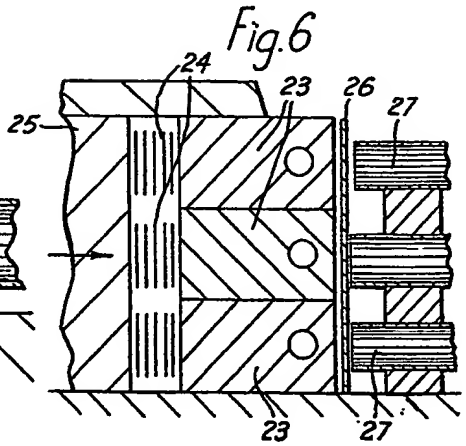


Fig. 6



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Sheets 1 & 2

Fig. 2

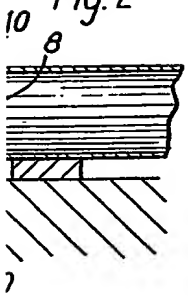
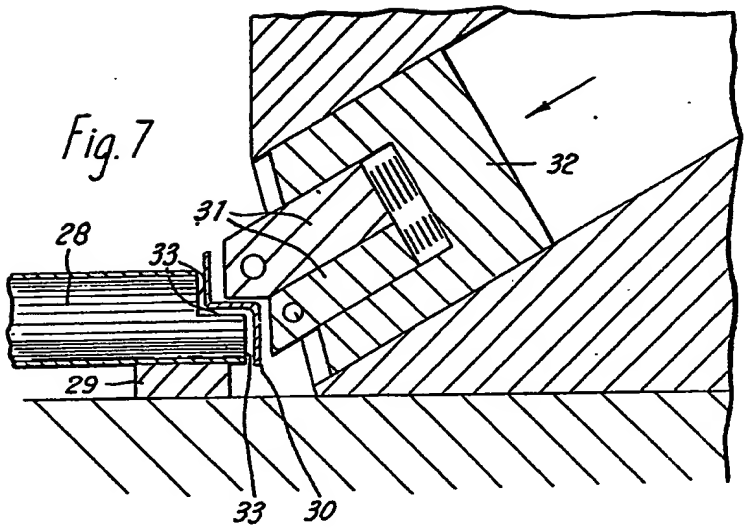


Fig. 7



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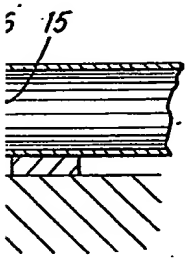


g.6

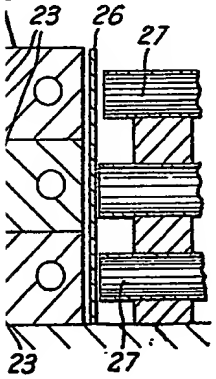
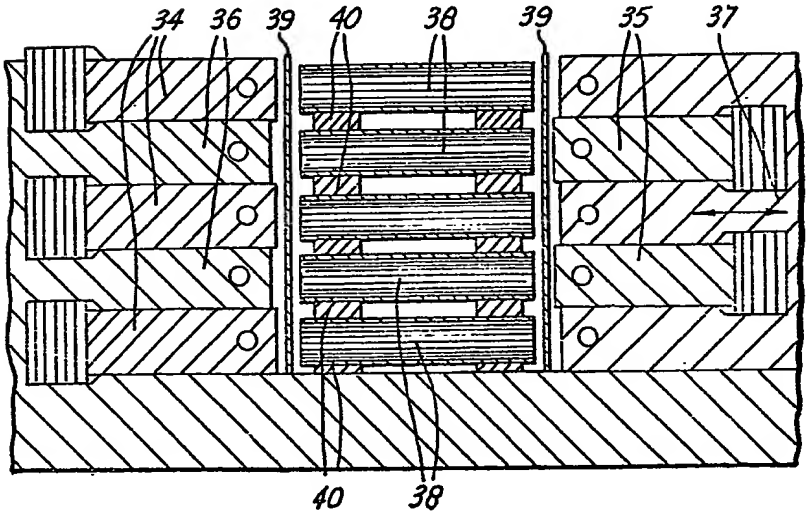


Fig. 8



1050517 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheets 1 & 2

Fig.1

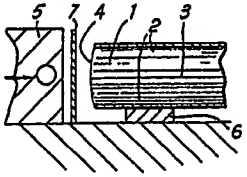


Fig.2

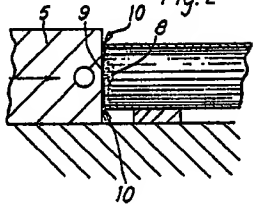


Fig.3

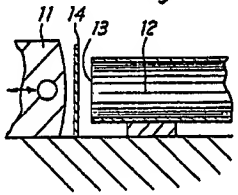


Fig.4

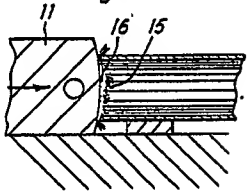


Fig.5

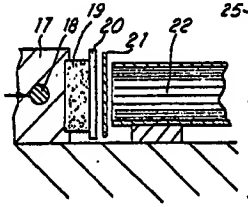


Fig.6

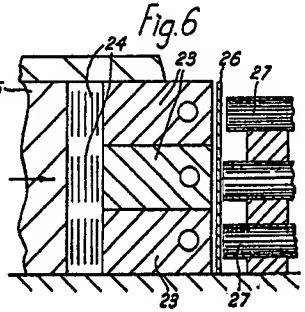


Fig.7

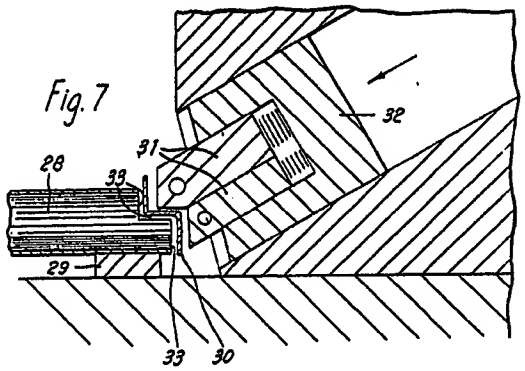


Fig.8